CUB RIVER ACRES (PWS 6210003)
SOURCE WATER ASSESSMENT FINAL REPORT

September 3, 2002

State of Idaho
Department of Environmental Quality

Executive Summary

Under the Safe Drinking Water Act Amendments of 1996, all states are required by the U. S. Environmental Protection Agency (EPA) to assess every source of public drinking water for its relative sensitivity to contaminants regulated by the act. This assessment is based on a land use inventory of the designated assessment area and sensitivity factors associated with the well and spring and aquifer characteristics.

This report, *Source Water Assessment for Cub River Acres, Preston, Idaho,* describes the public drinking water system, the boundaries of the zones of water contribution, and the associated potential contaminant sources located within these boundaries. This assessment should be used as a planning tool, taken into account with local knowledge and concerns, to develop and implement appropriate protection measures for this source. **The results should <u>not be</u> used as an absolute measure of risk and they should <u>not be</u> used to undermine public confidence in the water system.**

The Cub River Acres Public Water System (PWS #6210003) consists of one well, one spring, and two storage reservoirs in the Cub River Valley near Preston. There are three additional wells (for future use if needed) but none are connected to the water system at this time. The system currently serves approximately 160 persons through 76 connections.

Litz Creek Spring was constructed in 1973 and is the primary source of water for the system. It is located in an isolated area approximately five miles northeast of Mapleton, Idaho. Water is collected via a 22-inch steel pipe that is buried 15 feet into the hillside and discharged directly into two 30,000-gallon buried concrete storage reservoirs via three-inch PVC water lines. The spring's water is disinfected near the source before it is conveyed to the storage reservoirs.

Well # 3 is used for backup purposes during peak periods in the summer. The artesian well is located about three miles northeast of Mapleton, Idaho. The well was deepened in 1978 from 75 feet to 150 feet, and a pump was set at 135 feet.

Final susceptibility scores for Cub River Acres were derived from equally weighting system construction scores, hydrologic sensitivity scores, and potential contaminant/land use scores. Therefore, a low rating in one or two categories coupled with a higher rating in other categories results in a final rating of low, moderate, or high susceptibility. With the potential contaminants associated with most urban and heavily agricultural areas, the best score a well can get is moderate. Potential contaminants are divided into four categories, inorganic contaminants (IOCs, i.e.nitrates, arsenic), volatile organic contaminants (VOCs, i.e.petroleum products), synthetic organic contaminants (SOCs, i.e.pesticides), and microbial contaminants (i.e.bacteria). As different wells and springs can be subject to various contamination settings, separate scores are given for each type of contaminant.

The potential contaminant sources within the delineation capture zones vary for the well and the spring. The spring is located in an isolated area and has no contaminant sources in the delineation but a surface water corridor. The well has two potential contaminant sources, a transportation corridor and a stream. If an accidental spill occurred near any of these corridors or from a source, IOCs, VOCs, SOCs, or microbial contaminants could be added to the aquifer system.

For the assessment, a review of laboratory tests was conducted using the Idaho Drinking Water Information Management System (DWIMS) and the State Drinking Water Information System (SDWIS). The IOCs barium, calcium, fluoride, and nitrate have been detected in the drinking water, but below the maximum contaminant level (MCL) for each chemical as established by the EPA. In 2000, total coliform bacteria were detected in the distribution system. No VOCs or SOCs have ever been detected in the drinking water.

In terms of total susceptibility, Well # 3 rated moderate for IOCs, VOCs, SOCs, and microbials. The system construction score was moderate and the hydrologic sensitivity score was high. Potential contaminant inventory and land use scores were moderate for IOCs, VOCs, SOCs, and low for microbial contaminants.

In terms of total susceptibility, Litz Creek Spring rated low for IOCs, VOCs, SOCs, and microbials. The system construction score was low and the potential contaminant inventory and land use scores were low for IOCs, VOCs, SOCs, and microbial contaminants.

This assessment should be used as a basis for determining appropriate new protection measures or re-evaluating existing protection efforts. No matter what ranking a source receives, protection is always important. Whether the source is currently located in a "pristine" area or an area with numerous industrial and/or agricultural land uses that require surveillance, the way to ensure good water quality in the future is to act now to protect valuable water supply resources. If the system should need to expand in the future, new well sites should be located in areas with as few potential sources of contamination as possible, and the site should be reserved and protected for this specific use.

An effective drinking water protection program is tailored to the particular local drinking water protection area. A community with a fully developed drinking water protection program will incorporate many strategies. For the Cub River Acres, drinking water protection activities should continue efforts aimed at keeping the distribution system free of microbial contaminants that may affect the drinking water quality. The system should also focus on correcting any deficiencies outlined in the sanitary survey (an inspection conducted every five years with the purpose of determining the physical condition of a water system's components and its capacity). As land uses within most of the source water assessment area are outside the direct jurisdiction of Cub River Acres, partnerships with state and local agencies, industrial, and commercial groups should be established to ensure future land uses are protective of ground water quality.

Due to the time involved with the movement of ground water, drinking water protection activities should be aimed at long-term management strategies even though these strategies may not yield results in the near term. There are multiple resources available to help communities implement protection programs, including the Drinking Water Academy of the EPA. Drinking water protection activities for agriculture should be coordinated with the Idaho State Department of Agriculture, the Franklin County Soil and Water Conservation District, and the Natural Resources Conservation Service.

A system must incorporate a variety of strategies in order to develop a comprehensive drinking water protection plan, be they regulatory in nature (i.e. zoning, permitting) or non-regulatory in nature (i. e. good housekeeping, public education, specific best management practices). For assistance in developing protection strategies please contact the Pocatello Regional Office of the Idaho Department of Environmental Quality or the Idaho Rural Water Association.

SOURCE WATER ASSESSMENT FOR CUB RIVER ACRES, PRESTON, IDAHO

Section 1. Introduction - Basis for Assessment

The following sections contain information necessary to understand how and why this assessment was conducted. **It is important to review this information to understand what the ranking of this assessment means.** Maps showing the delineated source water assessment area and the inventory of significant potential sources of contamination identified within that area are included. The list of significant potential contaminant source categories and their rankings used to develop the assessment also is included.

Level of Accuracy and Purpose of the Assessment

The Idaho Department of Environmental Quality (DEQ) is required by the U. S. Environmental Protection Agency (EPA) to assess over 2,900 public drinking water sources in Idaho for their relative susceptibility to contaminants regulated by the Safe Drinking Water Act. This assessment is based on a land use inventory of the delineated assessment area, sensitivity factors associated with the well and spring and aquifer characteristics. All assessments must be completed by May of 2003. The resources and time available to accomplish assessments are limited. Therefore, an in-depth, site-specific investigation to identify each significant potential source of contamination for every public water system is not possible. **This assessment should be used as a planning tool, taken into account with local knowledge and concerns, to develop and implement appropriate protection measures for this source. The results should not be used as an absolute measure of risk and they should not be used to undermine public confidence in the water system.**

The ultimate goal of the assessment is to provide data to local communities so they can develop a protection strategy for their drinking water supply system. DEQ recognizes that pollution prevention activities generally require less time and money to implement than treatment of a public water supply system once it has been contaminated. DEQ encourages communities to balance resource protection with economic growth and development. The decision as to the amount and types of information necessary to develop a drinking water protection program should be determined by the local community based on its own needs and limitations. Wellhead or drinking water protection is one facet of a comprehensive growth plan, and it can complement ongoing local planning efforts.

Section 2. Conducting the Assessment

General Description of the Source Water Quality

The Cub River Acres Public Water System (PWS #6210003) consists of one well, one spring, and two storage reservoirs in the Cub River Valley near Preston. There are three additional wells (for future use if needed) but none are connected to the water system at this time. The system currently serves approximately 160 persons through 76 connections.

No volatile organic chemicals (VOCs) or synthetic organic chemicals (SOCs) have been detected in either the well or spring's water. The inorganic chemicals (IOCs) barium, calcium, fluoride, and nitrate have been detected in the spring water, but below the maximum contaminant level (MCL) for each chemical as established by the EPA. In 2000, total coliform bacteria were detected in the distribution system.

Defining the Zones of Contribution – Delineation

The delineation process establishes the physical area around a well or spring that will become the focal point of the assessment. The process includes mapping the boundaries of the zone of contribution into time-of-travel (TOT) zones (zones indicating the number of years necessary for a particle of water to reach a pumping well) for water in the aquifer. Washington Group International (WGI) was contracted by DEQ to define the public water system's zones of contribution. WGI used a conceptual computer model approved by the EPA in determining the 3-year (Zone 1B), 6-year (Zone 2), and 10-year (Zone 3) TOT for water associated with the Cache Valley hydrologic province in the vicinity of the Cub River Acres. The computer model used site specific data, assimilated by WGI from a variety of sources including operator records, well logs (when available) and hydrogeologic reports. A summary of the hydrogeologic information from the WGI is provided below.

Hydrogeologic Conceptual Model

Cache Valley is a complex graben covering about 310 square miles in southeastern Idaho and 350 square miles in northeastern Utah. It was once a bay of ancient Lake Bonneville resulting in lake terraces along the margins of the valley (Dion, 1969, p. 7). The related topographic features and deposits of ancient lakes affect the occurrence and movement of ground water (Bjorklund and McGreevy, 1971, p. 14).

The valley floor consists of unconsolidated valley-fill sediments of Quaternary age from the former Lake Bonneville and older lakes and streams, as well as younger alluvium. The sediments consist of silts and gravel of the Alpine and Bonneville formations, overlain by interfingering beds of gravel, sand, silt, and clay. Alluvial fan and landslide deposits are exposed along the margins of the valley. There is a general coarsening of sediments from lower elevations in the center of the valley to the higher elevations at the valley margins (Johnson et al. , 1996). The surrounding mountain ranges consist of highly faulted Tertiary Salt Lake and "Wasatch (?)" [sic] formation rocks and Permian through Precambrian rocks (Bjorklund and McGreevy, 1971, Plate 1).

The major aquifers are composed of sand and gravel in fans and deltas; interbedded layers of lake-bottom clays and silts confine the aquifers and cause artesian conditions throughout the valley (Bjorklund and McGreevy, 1971, p. 14). Deltas and fans from streams entering the valley generally contain a high percentage of gravel and are considered good aquifers (Bjorklund and McGreevy, 1971, p. 15). The exception is the Bear River delta, which is composed mostly of fine sand and silt and contains poor aquifers.

Aquifer recharge occurs mainly by infiltration of water from precipitation, streams, canals, ditches, and irrigated lands and by subsurface inflow. A large volume of recharge originates in the Bear River Range where 30 to 50 inches of precipitation fall in most years. Average annual precipitation on the valley floor is approximately 15. 5 inches (Bjorklund and McGreevy, 1971, pp. 5 and 18). The principal recharge area is along the margins of the valley that are underlain by permeable unconsolidated materials (Bjorklund and McGreevy, 1971, p. 18). In the lower parts of the valley, some water is recharged to shallow unconfined aquifers, but infiltrated water does not reach the confined aquifers in Idaho because of the upward artesian gradient.

Ground water is discharged by springs, seeps, drains, evapotranspiration, and wells. Many streams in Cache Valley originate at springs and seeps within the valley, and other streams gain in flow as they traverse the valley floor. Potentiometric levels range in elevation from about 4,850 feet above mean sea level (msl) near Oxford to about 4,500 feet near the Idaho-Utah border. Generally, the ground water flow direction is locally toward the Bear River and regionally south toward Utah. The Bear River in the Idaho part of Cache Valley is gaining (Bjorklund and McGreevy, 1971, p. 19).

Artesian conditions exist in a large part of the lower valley. Heads of most flowing wells are less than 40 feet above land surface, but heads as high as 62 feet above land surface have been measured (Bjorklund and McGreevy, 1971, p. 22). Water table conditions exist near the edge of the valley beneath alluvial slopes and benchlands. The depth to water is as much as 300 feet below ground surface (bgs) along the margin of the upper valley.

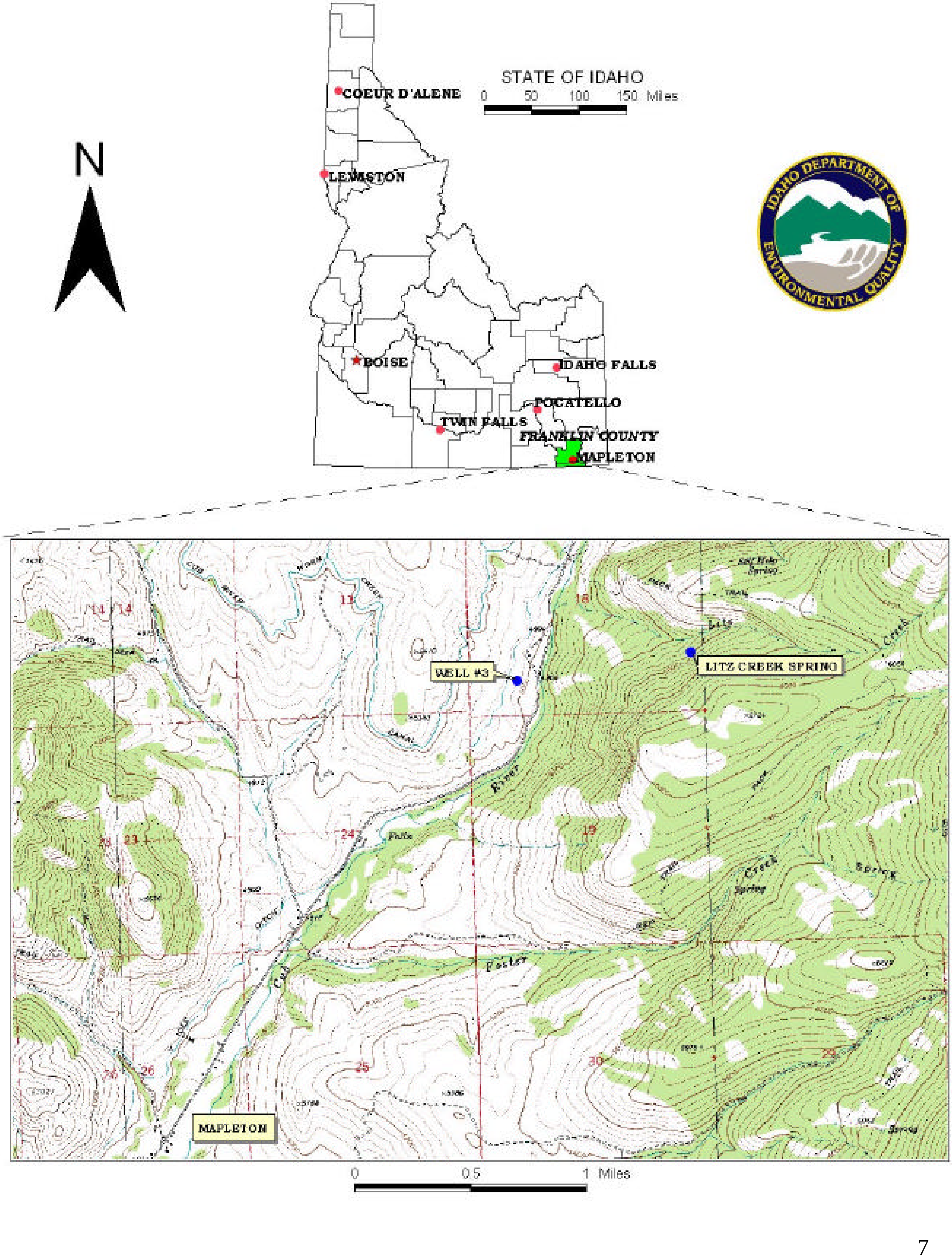
Most wells in the valley produce water from the unconsolidated basin deposits. Driller's logs indicate that the alluvium may contain several aquifers separated by silt and clay (Dion, 1969, p. 19). The most productive aquifer systems in the Idaho part of Cache Valley are in the area of Weston Creek and in fan deposits along the north and west sides of the valley. Aquifer tests near Weston indicate an average transmissivity of about 30,000 ft^2/day (Bjorklund and McGreevy, 1971, p. 2). Transmissivity values of 5,000 and 40,000 ft^2/day were reported from two tests conducted north of Clifton, Idaho (Johnson et al. , 1996, p. 21). For a computer-aided analysis of the resulting test data, the contact at the valley margin was conceptualized as a low- permeability boundary and simulated as a no-flow boundary (Johnson et al. , 1996, p. 11).

Capture Zone Modeling Method

Cache Valley hydrologic province delineations were performed using both the refined and the calculated fixed-radius methods. Selecting the method of delineation was based on well completion data, proximity of the well to the bedrock/valley-fill contact and/or faults, and knowledge of ground-water flow direction based on water table contour maps (Bjorklund and McGreevy, 1971, Plates 1 and 4, and Kariya et al. , 1994, Plate 2). For the Cub River Acres well, a uniform flow model was used. The Cub River Acres well is drilled into a confined shale aquifer where the direction and gradient of ground water flow can be reasonably assumed.

A uniform ground water flow gradient was established by specifying the flow direction and gradient using the uniform flow option in WhAEM (Kraemer et al. , 2000). A flow direction of 255 was specified in WhAEM to approximate the south-southwest flow direction of the Cub River in the vicinity of the well. The hydraulic gradient was assumed to be equivalent to the average land surface gradient of 0. 023, estimated from a 1:24,000 USGS topographic map.

FIGURE 1. Geographic Location of Cub River Acres



The base case hydraulic conductivity is 2.7 feet/day, which is the geometric mean of (1) the geometric mean of estimates for unfractured shale and (2) a single estimate for fractured shale based on pumping and slug tests conducted in the Soda Springs area (Ralston et al. , 1979, p. 31). The aquifer thickness is 75 feet, which is the thickness of the shale unit noted in the well driller's log. Effective porosity is 0.1. This is the maximum porosity noted by Todd (1980) and Cross et al. (1985) for shale. No areal recharge was used based on the fact that the well is flowing indicating an upward hydraulic gradient.

The pumping rate for the well was estimated by multiplying the average per capita water consumption of Cache Valley (279 gal/day) by one-half of the population served by the PWS. Well #3 is assumed to produce a maximum of one-half of the PWS water because it is a secondary water source.

Delineation of the wellhead protection area for a spring involves special consideration. Hydrogeologic setting is foremost among the factors that control the shape and extent of the capture zone. A spring resulting from the presence of a high permeability fracture extending to great depth will have a much different capture zone than a depression spring formed where the ground surface intersects the water table in a unconsolidated aquifer. The latter can be reasonably modeled as either a well or an internal constant head boundary. In many cases, however, the methods commonly used to delineate protection areas for water-supply wells are not applicable (Jensen et al. , 1997). Application of the refined method using WhAEM (Kraemer et al. , 2000), for instance, may not be appropriate for a fracture or tubular spring producing from an aquifer that displays a high degree of heterogeneity and anisotropy. Techniques that are most applicable to the springs within the scope of this report are the topographic, refined, and calculated fixed-radius methods. Hydrogeologic mapping techniques have been useful in characterizing the hydrogeologic setting and the zone of contribution to springs (Jensen et al. , 1997, pp. 6-7). Other techniques such as tracer and isotope studies, potentiometric surface mapping, geochemical characterization, and geophysical survey interpretation require data that are not available without additional fieldwork.

The topographic method was used to delineate capture zones for the Cub River Acres spring. The topographic method was chosen for springs that 1) are located within relatively small drainage basins with easily definable divides, 2) have an average annual discharge that can be reasonably supplied by an average annual precipitation in the drainage, and 3) have characteristics of a shallow system such as seasonal variations in discharge and temperature.

The assumption was made that ground water divides, which represent hydrologic boundaries to shallow ground water flow, are coincident with the topographic divides. Perennial streams or other surface water bodies that may infer the presence of hydrologic boundaries were identified. Surface geologic maps were also used to identify low permeability lithologic units that may form ground water flow boundaries and to infer the extent of lithologic units that provide water to springs. Calculating the amount of recharge needed to produce the average reported spring discharge checked the reasonableness of a topographic delineation. The required recharge was then compared to the average yearly precipitation in the area surrounding the spring.

Identifying Potential Sources of Contamination

A potential source of contamination is defined as any facility or activity that stores, uses, or produces, as a product or by-product, the contaminants regulated under the Safe Drinking Water Act. Furthermore, these sources have a sufficient likelihood of releasing such contaminants into the environment at levels that could pose a concern relative to drinking water sources. The goal of the inventory process is to locate and describe those facilities, land uses, and environmental conditions that are potential sources of ground water contamination. Field surveys conducted by DEQ, and review of databases, identified potential contaminant sources within the delineation areas. These sources include the Cub River and the Cub River Highway (Table 1) and Litz Creek (Table 2).

It is important to understand that a release may never occur from a potential source of contamination provided they are using best management practices. Many potential sources of contamination are regulated at the federal level, state level, or both to reduce the risk of release. Therefore, when a business, facility, or property is identified as a potential contaminant source, this should not be interpreted to mean that this business, facility, or property is in violation of any local, state, or federal environmental law or regulation. What it does mean is that the potential for contamination exists due to the nature of the business, industry, or operation. There are a number of methods that water systems can use to work cooperatively with potential sources of contamination, including educational visits and inspections of stored materials. Many owners of such facilities may not even be aware that they are located near a public water supply well.

Contaminant Source Inventory Process

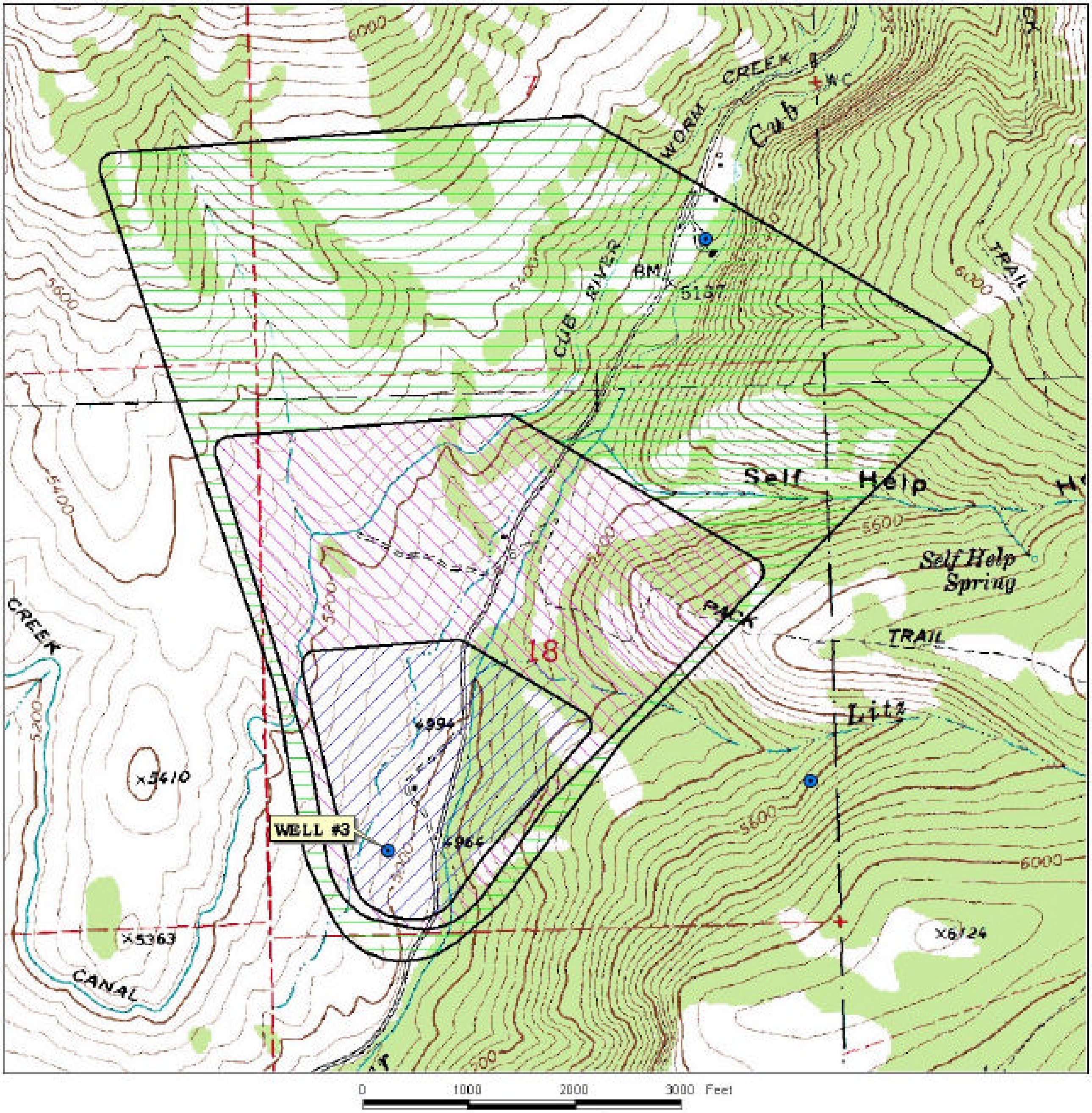
A two-phased contaminant inventory of the study area was conducted in April and May of 2002. The first phase involved identifying and documented potential contaminant sources within the Cub River Acres source water assessment area through the use of computer databases and Geographic Information System (GIS) maps developed by DEQ. The second, or enhanced, phase of the contaminant inventory involved contacting the operator to validate the sources identified in phase one and to add any additional potential sources in the area. Maps with the well and spring locations, delineated areas, and potential contaminant sources are provided with this report (Figure 2 and Figure 3). The potential contaminant sources are listed in Table 1 and Table 2.

Table 1. Cub River Acres, Well #3, Potential Contaminant Inventory

Site #	Source Description	TOT Zone[1] (years)	Source of Information	Potential Contaminants[2]
	Cub River	0-3	GIS Map	IOC, VOC, SOC, Microbial
	Cub River	3-6; 6-10	GIS Map	IOC, VOC, SOC
	Cub River Road	0-3	GIS Map	IOC, VOC, SOC, Microbial
	Cub River Road	3-6; 6-10	GIS Map	IOC, VOC, SOC

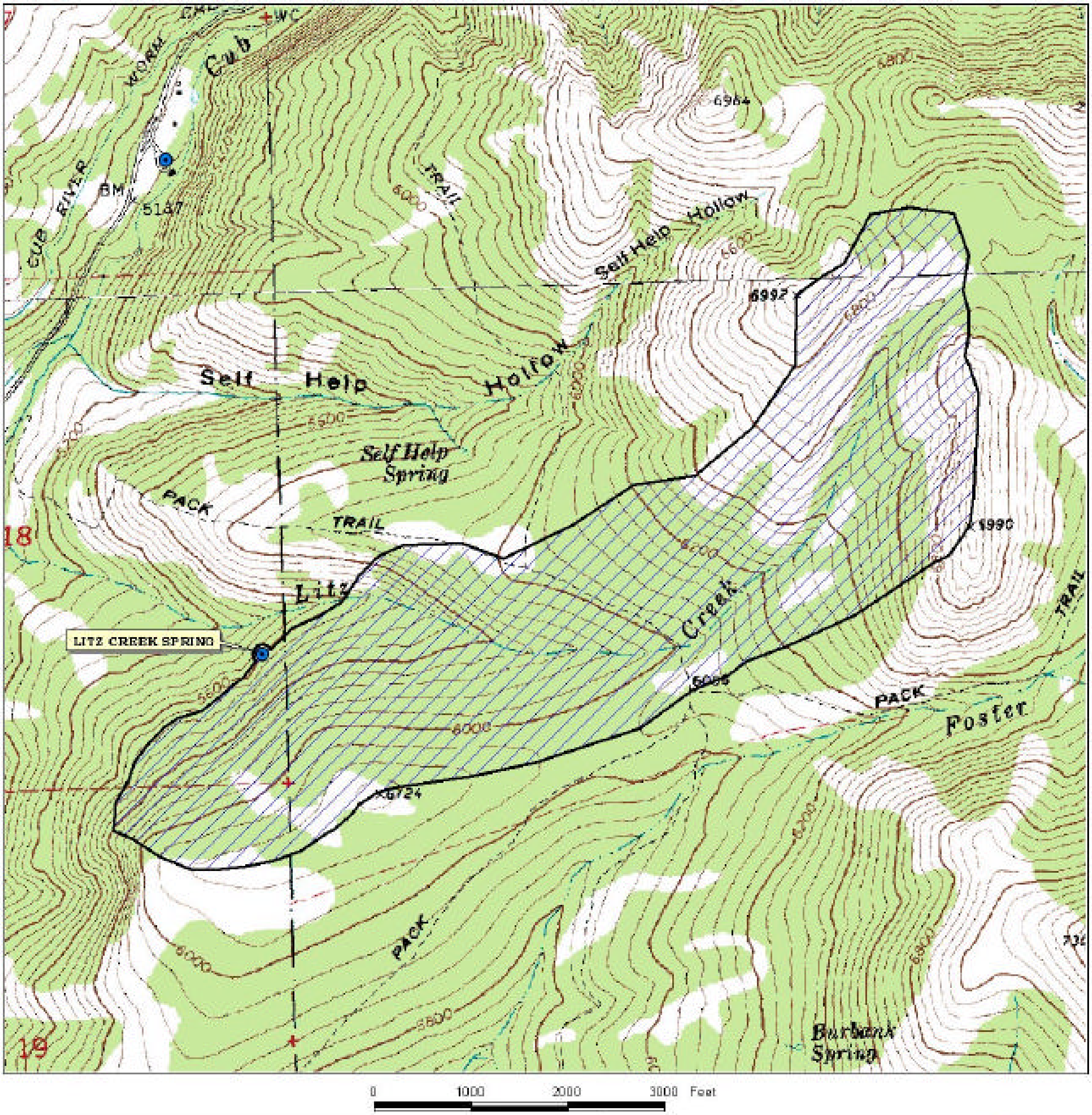
[1] TOT = time-of-travel (in years) for a potential contaminant to reach the wellhead
[2] IOC = inorganic chemical, VOC = volatile organic chemical, SOC = synthetic organic chemical

FIGURE 2. Cub River Acres Delineation Map and Potential Contaminant Source Locations



PWS# 6210003
WELL #3

FIGURE 3. Cub River Acres Delineation Map and Potential Contaminant Source Locations



PWS# 6210003
LITZ CREEK SPRING

Table 2. Cub River Acres, Litz Creek Spring, Potential Contaminant Inventory

Site #	Source Description	TOT Zone[1] (years)	Source of Information	Potential Contaminants[2]
	Litz Creek	0-3	GIS Map	IOC,VOC, SOC, Microbial

[1] TOT = time-of-travel (in years) for a potential contaminant to reach the wellhead
[2] IOC = inorganic chemical, VOC = volatile organic chemical, SOC = synthetic organic chemical

Section 3. Susceptibility Analyses

The susceptibility of the well and spring to contamination was ranked as high, moderate, or low risk according to the following considerations: hydrologic characteristics, physical integrity of the source, land use characteristics, and potentially significant contaminant sources. The susceptibility rankings are specific to a particular potential contaminant or category of contaminants. Therefore, a high susceptibility rating relative to one potential contaminant does not mean that the water system is at the same risk for all other potential contaminants. The relative ranking derived for each source is a qualitative, screening-level step that, in many cases, uses generalized assumptions and best professional judgement.

Attachment A contains the susceptibility analysis worksheets. The following summaries describe the rationale for the susceptibility ranking.

Hydrologic Sensitivity

The hydrologic sensitivity of a well is dependent upon four factors: These factors are surface soil composition, the material in the vadose zone (between the land surface and the water table), the depth to first ground water, and the presence of a 50-foot thick fine-grained zone (aquitard) above the producing zone of the well. Slowly draining soils such as silt and clay typically are more protective of ground water than coarse-grained soils such as sand and gravel. Similarly, fine-grained sediments in the subsurface and a water depth of more than 300 feet protect the ground water from contamination. This is based upon moderate to well drained soil classes as defined by the National Resource Conservation Service (NRCS). For this assessment, hydrologic sensitivity is not applicable to the spring's rating.

Well #3 rated high for hydrologic sensitivity (Table 3). Soils are classified as moderate to well-drained surrounding the well and it's delineation. The well log only describes drilling within the pre-existing 75 foot deep casing to a depth of 150 feet through gray shale, and placing a 10-inch casing to the bottom of the borehole. The vadose zone composition is unknown and it is unknown if an aquitard is present. As the well is artesian, depth to first water is ground level.

Well Construction

Well construction directly affects the ability of the source to protect the aquifer from contaminants. System construction scores are reduced when information shows that potential contaminants will have a more difficult time reaching the intake of the source. Lower scores imply a system is less vulnerable to contamination. For example, if the well casing and annular seal both extend into a low permeability unit, then the possibility of contamination is reduced and the system construction score goes down. If the highest production interval is more than 100 feet below the water table, then the system is considered to have better buffering capacity. If the wellhead and surface seal are maintained to standards, as outlined in sanitary surveys, then contamination down the well bore is less likely. If the well is protected from surface flooding and is outside the 100-year floodplain, then contamination from surface events is reduced.

Well #3 rated moderate for system construction (Table 3). The 2000 sanitary survey, conducted by DEQ, indicates that Well #3 has an adequate wellhead and surface seal and is protected from surface flooding. The score was increased because insufficient information on the well log prevented determining if the casing and annular seal extend to low permeability units. In addition, because the well is artesian, the highest production is not more than 100 feet below static water levels.

The Idaho Department of Water Resources (IDWR) *Well Construction Standards Rules (1993)* require all public water systems to follow DEQ standards. IDAPA 58. 01. 08. 550 requires that PWSs follow the *Recommended Standards for Water Works (1997)* during construction. Under current standards, all PWS wells are required to have a 50-foot buffer around the wellhead and if the well is designed to yield greater than 50 gallons per minute (gpm), a minimum of a 6-hour pump test is required. These standards are used to rate the system construction for the well by evaluating items such as condition of wellhead and surface seal, whether the casing and annular space is within consolidated material or 18 feet below the surface, the thickness of the casing, etc. In this case, there was insufficient information available to determine if the well meets all the criteria outlined in the IDWR Well Construction Standards.

Spring Construction

System construction directly affects the ability of the intake to protect the aquifer from contaminants. System construction scores are reduced when information shows that potential contaminants will have a more difficult time reaching the water in the spring. Lower scores imply a system is less vulnerable to contamination. For example, if the intake structure of the surface water system is properly located and constructed to minimize impacts from potential contaminant sources, then the possibility of contamination is reduced and the system construction score goes down. If the system was constructed in a way that the infiltration gallery is separated from any surface water so as to provide some kind of natural filtration, the water quality is more protected and the system score is reduced.

Litz Creek Spring rated low for system construction. The spring is fenced and water is taken directly from the source by a 22-inch pipe that is installed 15 feet into the hillside. The connections are encased in concrete. The spring water is chlorinated before it is conveyed to a storage reservoir. The low score reflects the fact that the spring construction was created in such a way as to prevent exposure to surface-derived contaminants.

Potential Contaminant Source and Land Use

The potential contaminant sources and land use within the delineated zones of water contribution are assessed to determine the well and spring's susceptibility. When agriculture is the predominant land use in the area, this may increase the likelihood of agricultural wastewater infiltrating the ground water system. Agricultural land is counted as a source of leachable contaminants and points are assigned to this rating based on the percentage of agricultural land. The predominant land use within the delineated area of the well is agricultural land and mountainous terrain for the spring.

In terms of potential contaminant sources and land use scores are as follows. Well #3 rated moderate for IOCs, VOCs, SOCs, and microbials while Litz Creek Spring rated low for all four types of contaminants (Table 3). The potential contaminant sources found within the delineated areas include the Cub River, Cub River Road, and Litz Creek. The locations of potential contaminant sources and delineated TOT zones for the well and spring are shown in Figure 2 and Figure 3 and listed in Table 1 and Table 2.

Final Susceptibility Ranking

A detection above a drinking water standard MCL, any detection of a VOC or SOC, or having potential contaminant sources within 50 feet of a wellhead or 100 feet of a spring intake will automatically lead to a high susceptibility rating to the final ranking. This ranking occurs despite the land use of the area because a pathway for contamination is shown to already exist. For the well, hydrologic sensitivity and system construction scores are heavily weighted in the final scores. Having multiple potential contaminant sources in the 0-3 year time of travel zone (Zone 1B) and a large percentage of agricultural land contribute greatly to the overall ranking.

Table 3. Summary of Cub River Acres Susceptibility Evaluation

Drinking Water Source	Susceptibility Scores[1]									
	Hydrologic Sensitivity	Potential Contaminant Inventory and Land Use				System Construction	Final Susceptibility Ranking			
		IOC	VOC	SOC	Microbials		IOC	VOC	SOC	Microbials
Well #3	H	M	M	M	L	M	M	M	M	M
Litz Creek Spring	NA	L	L	L	L	L	L	L	L	L

[1]H = High Susceptibility, M = Moderate Susceptibility, L = Low Susceptibility,
IOC = inorganic chemical, VOC = volatile organic chemical, SOC = synthetic organic chemical
NA = not applicable

Susceptibility Summary

In terms of total susceptibility, Well # 3 rated moderate for IOCs, VOCs, SOCs, and microbials. The system construction score was moderate and the hydrologic sensitivity score was high. Potential contaminant inventory and land use scores were moderate for IOCs, VOCs, SOCs, and low for microbial contaminants.

In terms of total susceptibility, Litz Creek Spring rated low for IOCs, VOCs, SOCs, and microbials. The system construction score was low and the potential contaminant inventory and land use scores were low for IOCs, VOCs, SOCs, and microbial contaminants.

The IOCs barium, calcium, fluoride, and nitrate have been detected in the drinking water, but below the maximum contaminant level (MCL) for each chemical as established by the EPA. In 2000, total coliform bacteria were detected in the distribution system. No VOCs or SOCs have been detected in the drinking water.

Section 4. Options for Drinking Water Protection

This assessment should be used as a basis for determining appropriate new protection measures or re-evaluating existing protection efforts. No matter what ranking a source receives, protection is always important. Whether the source is currently located in a "pristine" area or an area with numerous industrial and/or agricultural land uses that require surveillance, the way to ensure good water quality in the future is to act now to protect valuable water supply resources. If the system should need to expand in the future, new well sites should be located in areas with as few potential sources of contamination as possible, and the site should be reserved and protected for this specific use.

An effective drinking water protection program is tailored to the particular local drinking water protection area. A community with a fully developed source water protection program will incorporate many strategies. For the Cub River Acres, drinking water protection activities should first focus on correcting any deficiencies outlined in the sanitary survey. No potential contaminants (pesticides, paint, fuel, cleaning supplies, etc.) should be stored or applied within 50 feet of the well or 100 feet of the spring intake. Land uses within most of the source water assessment area are outside the direct jurisdiction of Cub River Acres, therefore collaboration and partnerships with state and local agencies, and industrial and commercial groups should be established to ensure future land uses are protective of ground water quality.

Due to the time involved with the movement of ground water, drinking water protection activities should be aimed at long-term management strategies even though these strategies may not yield results in the near term. There are multiple resources available to help communities implement protection programs, including the Drinking Water Academy of the EPA. Drinking water protection activities for agriculture should be coordinated with the Idaho State Department of Agriculture, the Franklin Soil and Water Conservation District, and the Natural Resources Conservation Service.

A community must incorporate a variety of strategies in order to develop a comprehensive drinking water protection plan, be they regulatory in nature (i.e. zoning, permitting) or non-regulatory in nature (i.e. good housekeeping, public education, specific best management practices). For assistance in developing protection strategies please contact the Pocatello Regional Office of the DEQ or the Idaho Rural Water Association.

Assistance

Public water supplies and others may call the following DEQ offices with questions about this assessment and to request assistance with developing and implementing a local protection plan. In addition, draft protection plans may be submitted to the DEQ office for preliminary review and comments.

Pocatello Regional DEQ Office	(208) 236-6160
State DEQ Office	(208) 373-0502

Website: http://www.deq.state.id.us

Water suppliers serving fewer than 10,000 persons may contact Ms. Melinda Harper (208) 343-7001 or email her at mlharper@idahoruralwater.com. Idaho Rural Water Association, for assistance with drinking water protection (formerly wellhead protection) strategies.

POTENTIAL CONTAMINANT INVENTORY LIST OF ACRONYMS AND DEFINITIONS

AST (Aboveground Storage Tanks) – Sites with aboveground storage tanks.

Business Mailing List – This list contains potential contaminant sites identified through a yellow pages database search of standard industry codes (SIC).

CERCLIS – This includes sites considered for listing under the **Comprehensive Environmental Response Compensation and Liability Act (CERCLA)**. CERCLA, more commonly known as ASuperfund≅ is designed to clean up hazardous waste sites that are on the national priority list (NPL).

Cyanide Site – DEQ permitted and known historical sites/facilities using cyanide.

Dairy – Sites included in the primary contaminant source inventory represent those facilities regulated by Idaho State Department of Agriculture (ISDA) and may range from a few head to several thousand head of milking cows.

Deep Injection Well – Injection wells regulated under the Idaho Department of Water Resources generally for the disposal of stormwater runoff or agricultural field drainage.

Enhanced Inventory – Enhanced inventory locations are potential contaminant source sites added by the water system. These can include new sites not captured during the primary contaminant inventory, or corrected locations for sites not properly located during the primary contaminant inventory. Enhanced inventory sites can also include miscellaneous sites added by the Idaho Department of Environmental Quality (DEQ) during the primary contaminant inventory.

Floodplain – This is a coverage of the 100-year floodplains.

Group 1 Sites – These are sites that show elevated levels of contaminants and are not within the priority one areas.

Inorganic Priority Area – Priority one areas where greater than 25% of the wells/springs show constituents higher than primary standards or other health standards.

Landfill – Areas of open and closed municipal and non-municipal landfills.

LUST (Leaking Underground Storage Tank) – Potential contaminant source sites associated with leaking underground storage tanks as regulated under RCRA.

Mines and Quarries – Mines and quarries permitted through the Idaho Department of Lands.)

Nitrate Priority Area – Area where greater than 25% of wells/springs show nitrate values above 5 mg/l.

NPDES (National Pollutant Discharge Elimination System) – Sites with NPDES permits. The Clean Water Act requires that any discharge of a pollutant to waters of the United States from a point source must be authorized by an NPDES permit.

Organic Priority Areas – These are any areas where greater than 25% of wells/springs show levels greater than 1% of the primary standard or other health standards.

Recharge Point – This includes active, proposed, and possible recharge sites on the Snake River Plain.

RCRA – Site regulated under **Resource Conservation Recovery Act (RCRA)**. RCRA is commonly associated with the cradle to grave management approach for generation, storage, and disposal of hazardous wastes.

SARA Tier II (Superfund Amendments and Reauthorization Act Tier II Facilities) – These sites store certain types and amounts of hazardous materials and must be identified under the Community Right to Know Act.

Toxic Release Inventory (TRI) – The toxic release inventory list was developed as part of the Emergency Planning and Community Right to Know (Community Right to Know) Act passed in 1986. The Community Right to Know Act requires the reporting of any release of a chemical found on the TRI list.

UST (Underground Storage Tank) – Potential contaminant source sites associated with underground storage tanks regulated as regulated under RCRA.

Wastewater Land Applications Sites – These are areas where the land application of municipal or industrial wastewater is permitted by DEQ.

Wellheads – These are drinking water well locations regulated under the Safe Drinking Water Act. They are not treated as potential contaminant sources.

NOTE: Many of the potential contaminant sources were located using a geocoding program where mailing addresses are used to locate a facility. Field verification of potential contaminant sources is an important element of an enhanced inventory.

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Attachment A

Cub River Acres
Susceptibility Analysis Worksheets

The final scores for the susceptibility analysis of the well was determined using the following formulas:

1) VOC/SOC/IOC Final Score = Hydrologic Sensitivity + System Construction + (Potential Contaminant/Land Use x 0.2)

2) Microbial Final Score = Hydrologic Sensitivity + System Construction + (Potential Contaminant/Land Use x 0.375)

Final Susceptibility Scoring:

0 - 5 Low Susceptibility

6 - 12 Moderate Susceptibility

≥ 13 High Susceptibility

The final scores for the susceptibility analysis of the spring was determined using the following formulas:

1) VOC/SOC/IOC Final Score = System Construction + (Potential Contaminant/Land Use x 0.818)

2) Microbial Final Score = Hydrologic Sensitivity + System Construction + (Potential Contaminant/Land Use x 1.125)

Final Susceptibility Scoring:

0 - 5 Low Susceptibility

6 - 12 Moderate Susceptibility

≥ 13 High Susceptibility

1. System Construction		SCORE			
Drill Date	05/16/1978				
Driller Log Available	YES				
Sanitary Survey (if yes, indicate date of last survey)	YES	2000			
Well meets IDWR construction standards	NO	1			
Wellhead and surface seal maintained	YES	0			
Casing and annular seal extend to low permeability unit	NO	2			
Highest production 100 feet below static water level	NO	1			
Well located outside the 100 year flood plain	YES	0			
	Total System Construction Score	4			
2. Hydrologic Sensitivity					
Soils are poorly to moderately drained	NO	2			
Vadose zone composed of gravel, fractured rock or unknown	YES	1			
Depth to first water > 300 feet	NO	1			
Aquitard present with > 50 feet cumulative thickness	NO	2			
	Total Hydrologic Score	6			
3. Potential Contaminant / Land Use - ZONE 1A		IOC Score	VOC Score	SOC Score	Microbial Score
Land Use Zone 1A	RANGELAND, WOODLAND, BASALT	0	0	0	0
Farm chemical use high	NO	0	0	0	
IOC, VOC, SOC, or Microbial sources in Zone 1A	NO	NO	NO	NO	NO
	Total Potential Contaminant Source/Land Use Score - Zone 1A	0	0	0	0
Potential Contaminant / Land Use - ZONE 1B					
Contaminant sources present (Number of Sources)	YES	2	2	2	2
(Score = # Sources X 2) 8 Points Maximum		4	4	4	4
Sources of Class II or III leacheable contaminants or	YES	2	2	2	
4 Points Maximum		2	2	2	
Zone 1B contains or intercepts a Group 1 Area	NO	0	0	0	0
Land use Zone 1B	Less Than 25% Agricultural Land	0	0	0	0
	Total Potential Contaminant Source / Land Use Score - Zone 1B	6	6	6	4
Potential Contaminant / Land Use - ZONE II					
Contaminant Sources Present	YES	2	2	2	
Sources of Class II or III leacheable contaminants or	YES	1	1	1	
Land Use Zone II	Less than 25% Agricultural Land	0	0	0	
	Potential Contaminant Source / Land Use Score - Zone II	3	3	3	0
Potential Contaminant / Land Use - ZONE III					
Contaminant Source Present	YES	1	1	1	
Sources of Class II or III leacheable contaminants or	YES	1	1	1	
Is there irrigated agricultural lands that occupy > 50% of	NO	0	0	0	
	Total Potential Contaminant Source / Land Use Score - Zone III	2	2	2	0

Cumulative Potential Contaminant / Land Use Score	11	11	11	4
4. Final Susceptibility Source Score	12	12	12	12
5. Final Well Ranking	Moderate	Moderate	Moderate	Moderate

1. System Construction		SCORE
Intake structure properly constructed	YES	0
Infiltration gallery or spring under the direct influence of Surface Water	NO	0
Total System Construction Score		0

2. Potential Contaminant / Land Use - ZONE 1A		IOC Score	VOC Score	SOC Score	Microbial Score
Land Use Zone 1A	RANGELAND, WOODLAND, BASALT	0	0	0	0
Farm chemical use high	NO	0	0	0	
IOC, VOC, SOC, or Microbial sources in Zone 1A	NO	NO	NO	NO	NO
Total Potential Contaminant Source/Land Use Score - Zone 1A		0	0	0	0
Potential Contaminant / Land Use - ZONE 1B					
Contaminant sources present (Number of Sources)	YES	1	1	1	1
(Score = # Sources X 2) 8 Points Maximum		2	2	2	2
Sources of Class II or III leacheable contaminants or	YES	1	1	1	
4 Points Maximum		1	1	1	
Zone 1B contains or intercepts a Group 1 Area	NO	0	0	0	0
Land use Zone 1B		0	0	0	0
Total Potential Contaminant Source / Land Use Score - Zone 1B		3	3	3	2
Cumulative Potential Contaminant / Land Use Score		3	3	3	2
4. Final Susceptibility Source Score		2	2	2	2
5. Final Spring Ranking		Low	Low	Low	Low